Software Testing

CANTATA

CANTATA CI/CD License

- ✓ A dedicated CI/CD license avoids taking up full-featured Cantata user licenses.
- ✓ Efficient for large-scale regression builds triggered at branch check-in.
- ✓ Transition from just nightly builds to continuous testing in a CI/CD pipeline.
- ✓ Concurrent build capacity pricing.

Full-feature Cantata licenses limit parallel regression test builds to the number of users, which can create a bottleneck.

User License

In contrast, a dedicated global Cantata CI/CD subscription license accelerates large regression tests, enabling 5 to 500 builds to run in parallel.

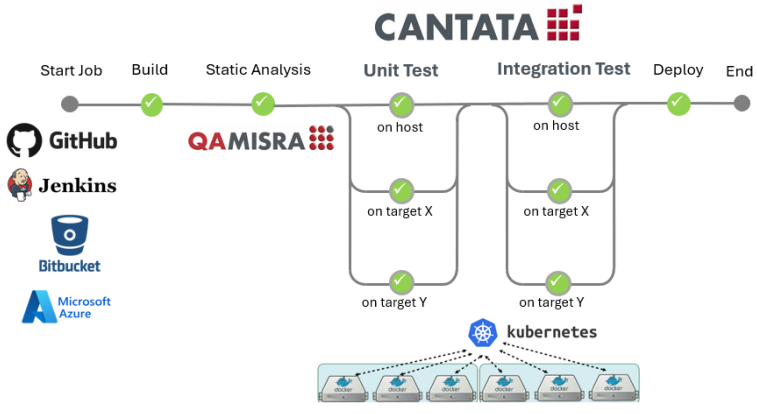
CI/CD License

Continuous Testing in CI/CD

Within a CI/CD pipeline, Cantata provides automated continuous unit and integration testing. Cantata tests can be rebuilt and run as a regression test suite each time code is checked into a repository.

Cantata integrates easily into a CI/CD pipeline using GitHub, Jenkins, Microsoft Azure, or Bitbucket, offering the following features:

- Portable tests generated or written in clean C/C++
- Open-standard file types for third-party tool integrations
- A comprehensive makefile architecture (GMake/CMake/Bazel)
- Full command-line installation and invocation, enabling Infrastructure as Code (IaC) automation in GitHub, Jenkins, Azure or Bitbucket CI/CD pipelines
- Parallelized builds under a dedicated CI/CD licencing model, ensuring continuous testing speed at scale for CI/CD pipelines.



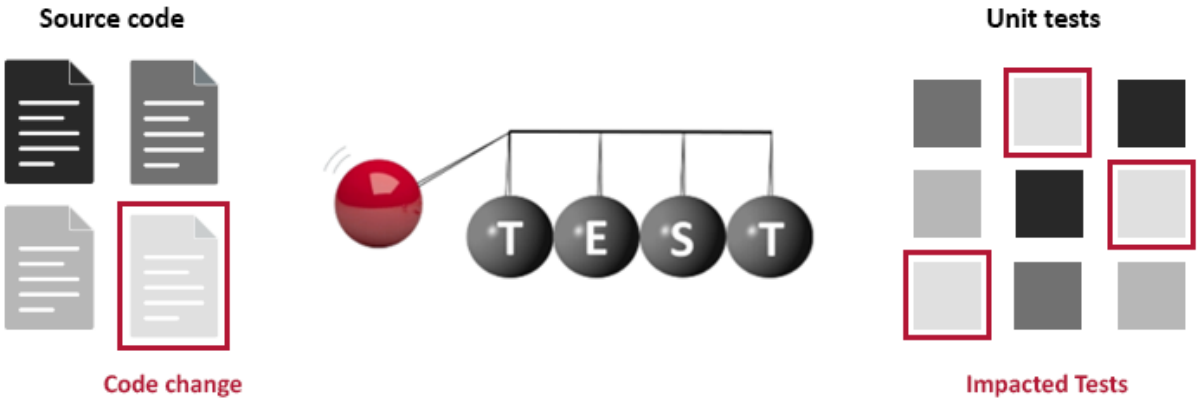
CI/CD pipeline with QA-MISRA static analysis and parallel Cantata tests running in Dockers

Test Infrastructure as Code

Cantata generates test cases, test harnesses, stubs, wrappers, and makefiles as clean code. The test scripts are produced in C or C++, making them simple to read, well-structured, and easy to maintain.

Because the tests are written in the same language as the code under test, they are intuitive to edit and customize directly in a code editor (also synchronized with the Eclipse GUI). This format allows tests to be maintained alongside the code under test. If your infrastructure is also maintained as code, this ensures repeatable, deterministic results every time you build and run your unit and integration tests.

Impact Analysis for Change Based Testing in CI/CD



When a change occurs in part of the codebase, running a full set of regression tests for every code object may not always be necessary. An approach known as “Change-Based Testing” can be adopted, where only the existing unit or integration tests affected by the code change are rebuilt and executed.

Cantata automatic Impact Analysis can be used to identify and re-run only the tests impacted by these code changes.

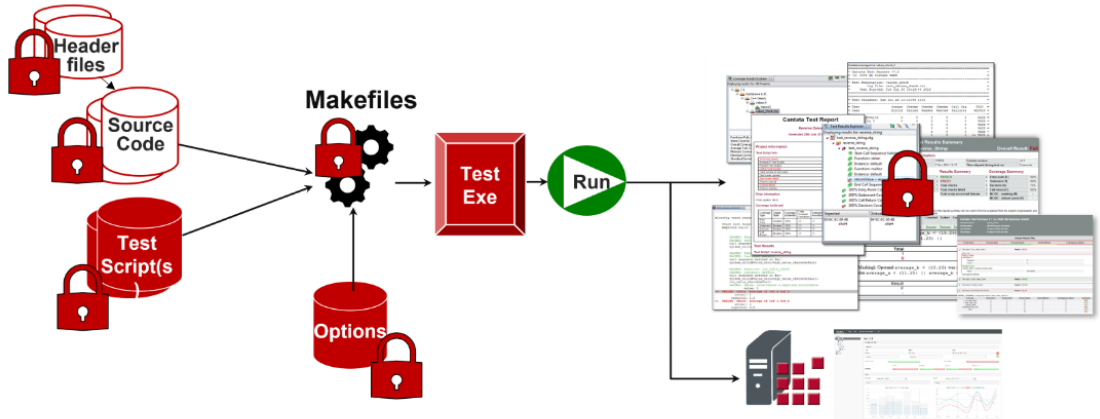
This is achieved by calculating the transitive closure of a software change to determine which code files have been modified and which specific unit or integration tests are impacted (or touched) by those files.

As a result, only the relevant subset of impacted tests needs to be re-run, reducing the complexity and execution time of the CI/CD pipeline. This allows for more frequent and faster branch check-ins with each code change.

Code Change Verification – Informed and Secured

Cantata uses a checksum to uniquely identify all components of the test executable for any given test build. This comprehensive and controlled baseline for test execution enables the identification and selective execution of all impacted tests, regardless of which specific component was changed.

In addition to identifying all input components of the test executable with a unique hash, the test execution results are also controlled using checksums. This ensures that all elements of Cantata testing provide secure evidence of test status, supporting compliance with safety standards that govern the management of lifecycle data.



Cantata test components uniquely locked by checksums for Impact Analysis and testing evidence security.

QA SYSTEMS
The Software Quality Company

QA Systems Group | sales@qa-systems.com | www.qa-systems.com
With offices in **Stuttgart, Germany** | Bath, UK | Milan, Italy |
Boston, United States | Da Nang, Vietnam | Bengaluru, India

QA-MISRA® and Cantata® are registered trademarks of QA Systems GmbH. © Copyright QA Systems GmbH 2024.
© All Copyright and Trademarks of third parties herein are acknowledged.